CVP Cost Allocation Study
November 19, 2013

Description of Analytical Tools

Name
Farm Budet Tool

Availability of Technical Support

Categories
Crop Budgeting

Main Features and Capabilities
- Crop Enterprise or Whole-farm Budgets

Applications
- Payment Capacity Studies
- Irrigation Benefits Studies

Calibration/Validation/Sensitivity Analysis
All studies utilizing the Farm Budget Tool obtain base data for cultural practices, machinery complements, and input amounts from published Extension Service Cost Estimates. Published primary data such as prices received and labor rates are collected from government sites such as USDA-NASS. Sensitivity analyses can be accomplished by changing a selected factor such as interest rates or yield and re-running the budget.

Peer Review
The current version of the Farm Budget Tool has been in continuous use for most of the last decade. Before the present Farm Budget Tool came into service, another spreadsheet application and a DBASE application were used. The earlier versions of the Farm Budget Tool were similarly formatted and made the same calculations.

Anatomy of Farm Budget Tool

Conceptual Basis
Conceptually, the Farm Budget tool simulates the decisions of agricultural producers (farmers) on a local or regional level through the use of representative crop budgets. Theoretically, farmers are assumed to maximize profit subject to resource, technical, and market constraints.

Theoretical Basis

Benefit values for irrigated agriculture are estimated following the criteria for measuring National Economic Development (NED) benefits defined in *The Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies*, March 10, 1983 (P&G's). The P&G's are the federal guidelines by which Reclamation determines NED benefits of federal actions or project implementation. A P&G analysis of NED agricultural benefits is based on a "with and without" project comparison.

Numerical Basis

Irrigation benefit values are estimated using a farm budget application developed by Reclamation. The farm budget methodology is used to estimate how valuable an irrigation water supply is to the crops produced within a project. This is accomplished by estimating the residual net farm income of a representative farm or crop expected to be found in the project area under "with" and "without" project conditions. A representative farm budget characterizes the production, management, and marketing strategies commonly used in producing the mix of crops expected to be produced on a farm considered to be typical of the project area. Each farm budget is sized to provide approximately full time employment to the operator through the growing season. Additionally, each budget provides a fair return to land, labor, and capital, as specified by the P&G's. Furthermore, the P&G's specify the debt load to be carried by the farm, and identify the prices and interest rates to be used in the analysis. Residual net farm income refers to the amount of farm income remaining after subtracting production costs and an allowance for management and labor from the gross farm income expected from the sale of crops. Agricultural benefits are calculated by estimating the residual net farm income for the "with" and "without" project farms. After estimating the residual net farm income for both conditions, the difference between the two residual net farm incomes is calculated; this difference is the agricultural benefit.

Input and Output

Main categories of inputs and outputs in the Farm Budget Tool are as follows. Inputs: (Water supply by source, Crop unit water use (ETAW), Ag water use efficiency, Crop production expenses, Crop yield, Crop price, Cost of groundwater pumping (energy cost), groundwater pumping depths and lifts, Farm policy) Outputs**:** Crop gross revenues, crop input costs, crop net revenues, returns to farm family.

Data Management

All input and output data are stored locally. Some input data are based on field and market information (e.g. crop yield, Ag water use efficiency, crop prices, and cost of water). Other inputs come from the result of other models like CALSIM to provide information on amount water supply available for Ag from SWP and CVP projects.

Software

The farm budget tool is a compiled Excel-based spreadsheet application.